this application is a CON of PCT/US02/11539 which of 09/833,139 pat. No. 6,810,062 11/18/07

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Optical Resonators with Mirror Structure Suppressing Higher Order Transverse Spatial Modes

RELATED APPLICATIONS

[01] This application is a Continuation of PCT application serial number PCT/US02/11539 filed on April 11, 2002 which is a Continuation-in-Part of U.S. application serial number 09/833,139 filed on April 11, 2001 both of which are incorporated herein by reference in their entirety.

11/18/07

BACKGROUND OF THE INVENTION

[02] Optical resonators include two or more mirror structures that define the resonator cavity. Optical resonators can be passive cavity devices as used, for example, in tunable Fabry-Perot (FP) filters. Active cavity devices include active media inside the optical resonator, such as gain medium, nonlinear optical medium, or electro-optic medium. The most common example of an active cavity optical resonator is the laser, which contains a gain medium, such as a semiconductor or a solid-state material, inside the cavity between the mirror structures.

[03] A reoccurring issue in optical resonator design, both in macroscopic and micro optical systems, is transverse spatial mode control. At scales associated with micro optical systems, which include single mode optical fiber, semiconductor gain media, and/or micro-opto-electro-mechanical system (MOEMS) devices, spatial mode control can dictate many system design variables.

[04] Typically, fundamental transverse mode operation is desired in laser devices because of the optical beam spatial profile requirements for long distance beam propagation, focusing of beams into small spots, and beam coupling into single mode transmission fibers. In addition, different spatial modes of an optical resonator typically have different resonant optical frequencies, which characteristic is detrimental for active and passive cavity applications requiring spectral purity. A typical application requiring